

# DIPTERA FROM NEPAL

## BIBIONIDAE<sup>1</sup>

By D. ELMO HARDY

### SYNOPSIS

This study is based upon sixty-one specimens collected by Ralph L. Coe, British Museum (Natural History) 1961-62 expedition to Nepal, and seventeen specimens collected by L. W. Swan, American expeditions to Nepal 1954 and 1960. The collections contained twelve species in four genera of Bibionidae. Six of the species are apparently undescribed and ten are new records for Nepal. One additional species, *Penthetria indica* (Brunetti), has been recorded from Nepal but was not represented in the collections.

THIS most valuable collection gives us considerable insight into a previously almost entirely unknown fauna and adds materially to our knowledge of the Bibionidae of the Oriental region.

I am indebted to Ralph L. Coe for the privilege of studying the material from the British Museum collection and to Dr. Edward Kessel and Paul Arnaud for the loan of specimens from the California Academy of Sciences. I am also grateful to Mrs. Rogene Radner for preparing the illustrations.

### TAXONOMIC ARRANGEMENT OF THE KNOWN BIBIONIDAE OF NEPAL

#### Subfamily Pleciinae

*Penthetria atra* (Brunetti)

*P. indica* (Brunetti)\*

*P. japonica* Wiedemann

*Plecia mallochi* Hardy ? ♀

*P. sp. ? ♀ impostor* complex

#### Subfamily Bibioninae

*Bibio ablusus* n. sp.

*B. affiniproximus* n. sp.

*B. capitaneus* n. sp.

*B. nigerrimus* Duda

*B. scaurus* n. sp.

*B. totonigra* n. sp.

*Dilophus gratiosus* Bigot

*D. hirsutus* n. sp.

\*Not present in this collection.

### KEY TO KNOWN SPECIES OF BIBIONIDAE FROM NEPAL

- |   |  |  |   |
|---|--|--|---|
| 1 | Front tibia lacking spines or spurs. Vein $R_{2+3}$ present (Text-fig. 3).   | Pleciinae  | 2 |
| — | Front tibia with large apical spurs (Text-fig. 11) or with a ring of spines at the apex and a row of four spines across the middle (Text-fig. 46). | Bibioninae   | 6 |
| 2 | Vein $R_{2+3}$ short, oblique or vertical in position (Text-fig. 6).   | <i>Plecia</i> Wiedemann                            | 3 |
| — | Vein $R_{2+3}$ elongate, almost horizontal in position (Text-fig. 3).  | <i>Penthetria</i> Meigen                           | 4 |
| 3 | Thorax entirely rufous   | <i>Plecia mallochi</i> Hardy (and related species) |   |
| — | Pleura black, front margin of mesonotum dark coloured  | <i>Plecia impostor</i> Brunetti complex            |   |
| 4 | At least posterior half of mesonotum bright orange   |  | 5 |
| — | Entirely black species   | <i>Penthetria atra</i> (Brunetti)                  |   |

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- 5 Anterior portion of mesonotum black . . . . . *P. japonica* Wiedemann  
 — Mesonotum entirely rufous . . . . . *P. indica* (Brunetti)
- 6 Front tibia with a row of apical spines and with four spines across the middle (Text-fig. 46). *Dilophus* Meigen . . . . . 7  
 — Front tibia with apical spurs. *Bibio* Geoffroy . . . . . 8
- 7 Basal section of radial sector very short, about one-fifth as long as the *r-m* crossvein (Text-fig. 50). Body and legs densely black pilose. Spines of front tibia arranged as in Text-fig. 49 . . . . . *D. hirsutus* n. sp.  
 — Basal section of radial sector nearly one-half as long as *r-m* (Text-fig. 47). Body and legs sparsely yellow pilose. Spines of front tibia arranged as in Text-fig. 46 . . . . . *D. gratiosus* Bigot
- 8 Spurs of front tibia sharp pointed (Text-figs. 18 and 22) . . . . . 9  
 — Outer spur of front tibia rounded, blunt at apex (best seen from lateral view) (Text-fig. 30). Ninth tergum of male with a U-shaped hind margin (Text-fig. 33). Antenna 10-segmented. Large subopaque black species . . . . . *B. nigerrimus* Duda
- 9 Wings entirely hyaline, except for the stigma; posterior veins colorless . . . . . 10  
 — Wings distinctly infuscated, darker on the anterior margin; posterior veins darker than the membrane . . . . . 11
- 10 Large species, male body 15.5 mm.; wings 14.0 mm. Crossvein *r-m* less than half as long as the base of the *Rs* (Text-fig. 25). Last segment of palpus six times longer than wide (Text-fig. 23). . . . . *B. capitaneus* n. sp.  
 — Small species, body 5.0 mm.; wings 4.6 mm. Crossvein *r-m* equal in length to the base of *Rs*. Last segment of palpus scarcely longer than wide (Text-fig. 14) . . . . . *B. affiniproximus* n. sp.
- 11 Hind basitarsi of male not swollen; wings evenly fumose, not spotted . . . . . 12  
 — Hind basitarsi of male swollen (Text-fig. 35). Female with brown spots on the wings as in Text-fig. 37 . . . . . *B. scaurus* n. sp.
- 12 Inner spur well developed, subequal to outer (Text-fig. 42). Body entirely black pilose. Wings smoky black, costal cell and stigma black. Last segment of palpus elongate, 6-7 times longer than wide. Crossvein *r-m* approximately equal to the base of *Rs* (Text-fig. 40). . . . . *B. totonigra* n. sp.  
 — Inner spur of front tibia rudimentary, very small compared to the outer (Text-fig. 11). Body predominantly yellow pilose. Wings lightly fumose, costal cell brownish yellow, stigma brown. Last segment of palpus short, scarcely longer than wide. Crossvein *r-m* about one-half as long as basal section of *Rs* (Text-fig. 9) . . . . . *B. ablusus* n. sp.

### Subfamily PLECIINAE

#### Genus PENTHETRIA Meigen

*Penthetria* Meigen, 1803, *Illiger's Mag.* **2** : 264.

*Threneste* Wiedemann, 1830, *Ausseeurop. zweifl. Ins.* **2** : 618 (refer to Edwards, 1928 : 683).

*Eupeitenus* Macquart, 1838, *Dipt. exot. nouv. ou peu connus* **1** : 85.

*Crapitula* Gimmerthal, 1845, *Bull. Soc. Nat. Moscou*, **18** : 330.

*Pleciomyia* Brunetti, 1911, *Rec. Indian Mus.* **4** : 269.

*Parapleciomyia* Brunetti, 1912, *Rec. Indian Mus.* **7** : 446.

The members of this genus differ from *Plecia* by having vein  $R_{2+3}$  elongate and horizontal in position, almost parallel to vein  $R_{4+5}$ , and the claspers of the male genitalia lateral in position and large and conspicuous.

Three species have been recorded from Nepal, two of these (*P. atra* (Brunetti) and *japonica* Wiedemann) are present in this collection. *P. indica* (Brunetti) was recorded by Brunetti (1911 : 272).

Type species : *Penthetria holosericea* Meigen.

***Penthetria atra*** (Brunetti)

(Text-figs. 1-4)

*Plecia atra* Brunetti, 1911, *Rec. Indian Mus.* 4 : 272.

To date only female specimens of *atra* have been recorded. It is readily recognized from all other known *Penthetria* from this region by its entirely black coloration. I have on hand a male specimen from Sze-chuan, China, which appears to be this species. It is highly probable, however, that a complex of species may have the same general appearance and it would not be practical to describe this male as *atra*.

♀. Entirely black species covered with short black setae over the body and legs. The head is short and broad. The rostrum is not developed and the front has a prominent tubercle on the lower median portion. As seen in dorsal view the head is as in Text-fig. 2. The antennae are twelve-segmented (Text-fig. 1) ; Brunetti, in the original description, indicated this, but his figure (1912, plate 12, fig. 16) shows only eleven segments with an indication of two segments being present in the first joint of the flagellum. The wings are entirely smoky black. The venation is as in Text-fig. 3. The forking of veins  $M_1$  and  $M_2$  is well beyond the  $r-m$  crossvein. The female genitalia are as in Text-fig. 4.

Brunetti recorded the length of this species as 8.0-12.0 mm. The specimens at hand measure 9.5 mm. for the body and 10.0 mm. for the wings.

Brunetti's type-series was from Bhim Tal, KUMAON, western Himalayas and from Soondrijal, NEPAL. Type in the Indian Museum.

NEPAL : Taplejung Distr., Sangu, c. 6,200', bamboo plantation, 1 ♀, II. x. 1961 ; by rocky stream, 1 ♀, 7-16. x. 1961 ; and mixed vegetation by stream in valley, 1 ♀, ix-x. 1961 (*R. L. Coe*), B.M. (N.H.).

***Penthetria indica*** (Brunetti)*Plecia indica* Brunetti, 1911, *Rec. Indian Mus.* 4 : 271.

Type locality, Darjeeling. Evidently widely distributed through northern India and Nepal. Brunetti recorded cotypes from Soondrijal, Nepal. Type in the Indian Museum.

This species was not present in the collection of the British Museum from Nepal.

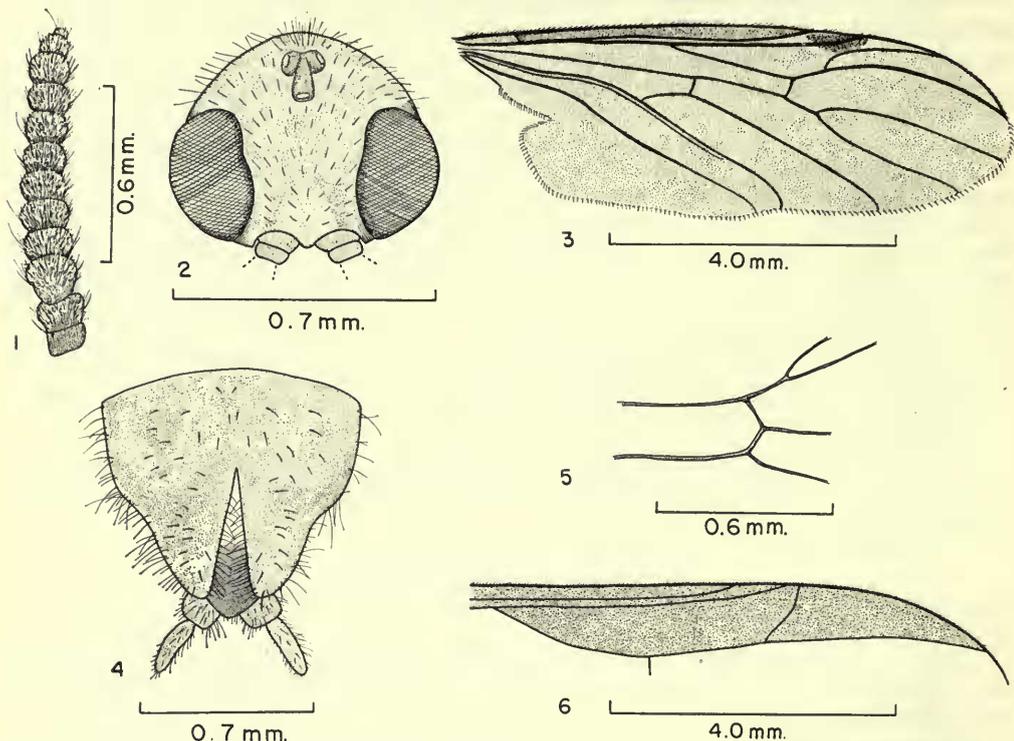
*P. indica* is differentiated from other *Penthetria* known from this section of the world by having the mesonotum entirely rufous, also by the comparatively short vein  $R_{2+3}$ .

The following notes were made from a ♀ specimen from INDIA ; United Province, Naini Tal, 6,750', 25. ii. 1934 (*J. A. Graham*), B.M. (N.H.).

The entire dorsum of the thorax is opaque orange except for the apex of the scutellum, which is shiny black. The remainder of the body and all appendages are black ; the pleura and femora have a faint brownish to reddish tinge in the ground colour. The mesonotum is sparsely covered with short yellow hairs. As seen from a dorsal view the head is slightly wider than long, the rostrum is not well developed. The ocellar tubercle is well developed and a rather prominent tumescence is present just above the antennae in the middle of the front. The antennae are twelve-segmented. The leg joints are slender, the hind basitarsus is about one-third as long as the tibia. The pile of the coxae and femora is short, yellow, and the tibiae have short yellow pile with some brown to black pile intermixed. The tarsi are covered with brown to black pile. The wings are smoky brown, darker along the anterior margin. The stigma is dark brown, scarcely darker than the membrane. Vein  $R_{2+3}$  is about equal in length to the distance from the  $r-m$  crossvein to the forking of veins  $R_{2+3}$  and  $R_{4+5}$ . In this respect

this species is somewhat *Plecia*-like but vein  $R_{2+3}$  extends almost parallel to  $R_{4+5}$  and in this respect would fit *Penthetria*. The fork of veins  $M_1$  and  $M_2$  is situated well before the forking of veins  $R_{2+3}$  and  $R_{4+5}$ .

Length (of the specimen studied) : Body, 8.5 mm.; wings, 10.3 mm.  
Brunetti in the original gave the length as 6.9 mm.



FIGS. 1-4. *Penthetria atra* (Brunetti). Fig. 1, antenna ; Fig. 2, head of ♀, dorsal ; Fig. 3, wing ; Fig. 4, ♀ genitalia, ventral. FIG. 5. *Penthetria japonica* Wiedemann, section of wing showing branching of  $M_1$  and  $M_2$ . FIG. 6. *Plecia mallochi* Hardy?, anterior margin of wing showing fork of radial sector.

### *Penthetria japonica* Wiedemann (Text-fig. 5)

*Penthetria japonica* Wiedemann, 1830, *Aussereurop. zweifl. Ins.* 2 : 618.

*Plecia ignicollis* Walker, 1848, *List Dipt. Ins. Brit. Mus.* 1 : 116.

For a discussion of this synonymy refer to Hardy (1956 : 85) and to Hardy and Takahashi (1960 : 390). As discussed in the latter reference, *P. japonica* has been commonly treated in the literature as a synonym of *P. melanaspis* Wiedemann; however, the male claspers are rather strongly curved downward, rather blunt at their apices in *japonica* and are straight-sided, rather sharply pointed at the apices

in *melanaspis*. Refer to figures 2 C-D and 3A in Hardy and Takahashi (1960 : 390 and 392). This has been treated by Brunetti : (1911 : 270; and 1912 : 161) as *Pleciomyia melanaspis* Wied.

*P. japonica* also resembles *motschulskii* (Gimmerthal), from northern China, Siberia and Sakhalin but the wing venation is distinctly different. In *japonica* vein  $M_1$  is joined directly to the *r-m* crossvein (Text-fig. 5) and not joined with  $M_2$  beyond this crossvein, in *motschulskii* vein  $M_{1+2}$  extends well beyond the *r-m* crossvein. Also the genitalia are very different in the two species. *P. motschulskii* has the claspers greatly thickened and blunt (fig. 3B, Hardy and Takahashi 1960 : 392).

*P. japonica* is readily recognized from other known *Penthetria* in Nepal or northern India by having the posterior portion of the mesonotum orange to rufous and the anterior portion velvety black. The remainder of the body and appendages, including the wings, is entirely black.

For a more adequate description, refer to Hardy and Takahashi (1960 : 390-391).

Length of male : Body and wing, 9.0-10.0 mm. Length of female : Body, 10.0-10.7 mm. ; wings, 7.0-12.0 mm.

Type locality : JAPAN. Type in the Zoologisches Museum, Humboldt Universitat, Berlin.

I have studied specimens of this species from a wide range of localities throughout NORTHERN INDIA, CHINA, and FORMOSA, as well as JAPAN.

NEPAL, Taplejung Distr., Sangu, c. 6,200', mixed vegetation by stream in gully, 1 ♀, ix. - x. 1961 (*R. L. Coe*), B.M. (N.H.). Three specimens, two ♂ and one ♀, are in the California Academy of Sciences collection from NEPAL : Manga Deorali, 5,500', 7. xi. 1960 (*L. Swan*) ; Chyaubas to Risingo, 4,000', no date given—no doubt x. or xi. 1960 (*L. Swan*) ; and Pass Camp near Tarebhir, 4,500', 26. x. 1960 (*L. Swan*). Brunetti (1912 : 161) recorded this species as *Pleciomyia melanaspis* (Wiedemann), from Soondrijal and Katmandu, Nepal.

#### Genus *PLECIA* Wiedemann

*Plecia* Wiedemann, 1828, *Ausseureurop. zweifl. Ins.* 1 : 72.

Members of this genus are differentiated from *Penthetria* by the short, almost vertical, vein  $R_{2+3}$  (Text-fig. 6) and by the vertical, comparatively small, claspers of the male.

Two species are present from Nepal. Both are represented only by females and positive identification is impossible without the males.

Type species : *Hirtea fulvicollis* Fabricius.

#### *Plecia* sp. ? ♀ *impostor* complex

One female specimen of the *Plecia impostor* complex is in the California Academy of Sciences collection from NEPAL : Chyaubas to Risingo, 4,000', no date given—probably collected x. or xi. 1960 (*L. Swan*). It is impossible to identify species of this complex without the males. The group is characterized by having the mesonotum rufous except for a brown marking on the anterior portion. For a revision of the known Oriental species refer to Hardy 1953.

***Plecia mallochi* Hardy ?**

(Text-fig. 6)

*Penthetria thoracica* Guérin-Ménéville, 1833, in Bélanger, *Voy. Indes Orientales*, : 507. Paris. [Preoccupied by *Laphria thoracica* Fabricius, 1805, *System. Antl.* : 163, a synonym of *Plecia collaris* (Fabricius)].

*Plecia confusa* Malloch, 1928, *Proc. Linn. Soc. N.S. Wales*, **53** : 605, nec *P. confusa* Loew.

*Plecia mallochi* Hardy, 1948, *J. Kans. ent. Soc.* **21** : 36. [Change of name for *P. confusa* Malloch, preoccupied by *P. confusa* Loew, 1858, *Berl. ent. Z.* **2** : 109.]

*Plecia dispersa* Hardy, 1958 : 196. [This was presented as a new name for *mallochi* but the latter is available to replace *thoracica* Guérin-Ménéville.]

The *Plecia* which have the thorax entirely rufous have been commonly treated in the literature under the name *fulvicollis* (Fabricius). Brunetti (1912 : 163) treated *Penthetria thoracica* Guérin (= *mallochi* Hardy), *Plecia dorsalis* Walker and *Plecia subvariens* Walker as synonyms under *fulvicollis*. It is probable that none of these are actually synonyms. Brunetti's concept was based entirely upon colour and obviously included an assortment of species. The species from Nepal may probably be *P. mallochi*, which was described from Coromandel, S. E. India, but as I have recorded (Hardy, 1958 : 197) it is one of the common species of India and Ceylon.

One ♀ from NEPAL : Arun Valley, below Tumlingtar, River Sabhaya, west shore, c. 1,800', 21.xii.1962. (*R. L. Coe*), B.M. (N.H.), appears to be this species, but it cannot be positively identified without the male. The specimen is larger than any *mallochi* which I have previously seen : the body measures 9.0 mm. and the wing 12.5 mm. although females of *mallochi* will range to 8.5 mm. for the body and approximately 11.0 mm. for the wing and this difference is insignificant.

*P. mallochi* is related to *javensis* Edwards because of the poorly developed ocellar triangle of the male and is differentiated by the broad blunt claspers and the differences in the shape and development of the ninth sternum and tergum of the male. Refer to Hardy (1958 : 196-197—under *P. dispersa*) for descriptive details and figures.

Genus **BIBIO** Geoffroy

*Bibio* Geoffroy, 1764, *Hist. Nat. Insectes*, **2** : 571.

*Pullata* Harris, 1776, *Expos. Eng. Ins.* : 76.

*Hirtea* Fabricius, 1798, *Ent. Syst., Suppl.*, : 551 (nec Scopoli, 1763).

*Bibiophus* Bollow, 1954, *Z. PflBau* **5** (5) : 209, 211.

This genus is characterized by the development of strong apical spurs on the front tibiae (Text-fig. 11), and by the simple radial sector, with the basal portion equal to or longer than the *r-m* crossvein. *Bibio* are rather conspicuously hairy flies, the antennae are short, the segments are thick and closely compressed.

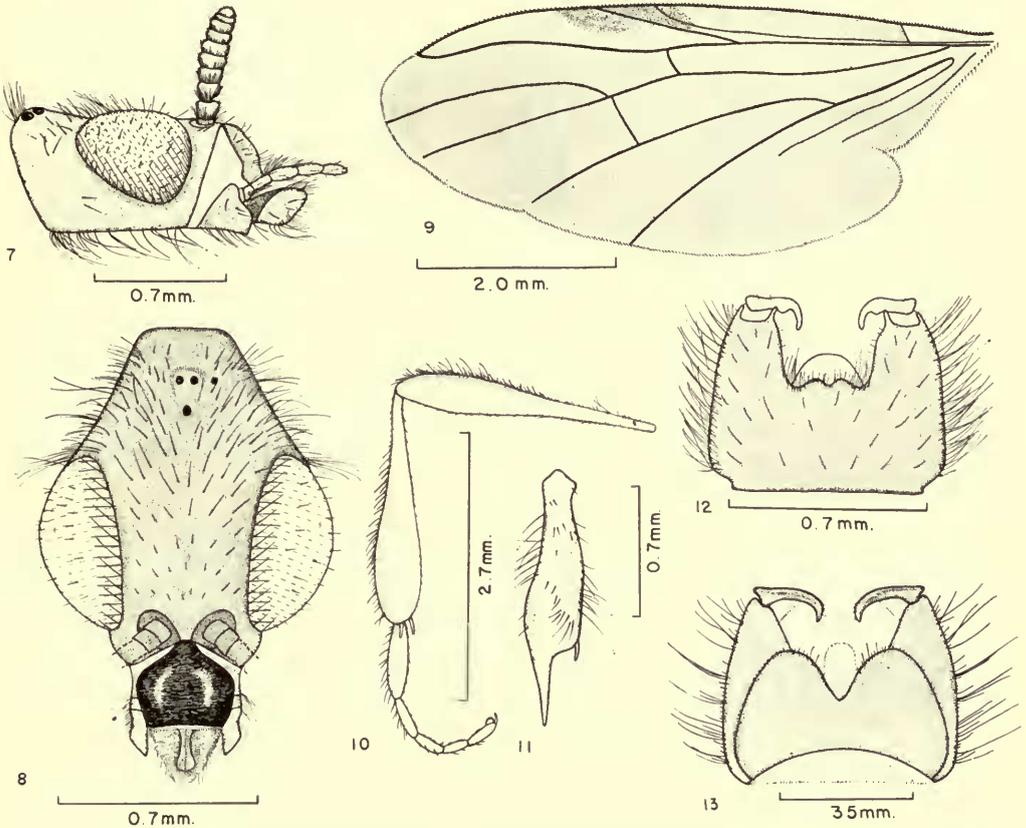
Six species of *Bibio* are known to occur in Nepal, only one of these, *B. nigerrimus* Duda, has been previously recorded. The other five are apparently undescribed.

Type species : *Tipula hortulana* Linnaeus.

*Bibio ablusus* n. sp.

(Text-figs. 7-13)

This species appears to be related to *B. totonigra* n. sp. but differs by having the body predominantly yellow pilose; the wings lightly fumose; the *r-m* crossvein short, about one-half as long as the basal section of *Rs*; and the terminal segment of the palpus short.



FIGS. 7-13. *Bibio ablusus* n. sp. Fig. 7, ♀ head, lateral; Fig. 8, ♀ head, dorsal; Fig. 9, wing; Fig. 10, hind leg, ♂; Fig. 11, front tibia; Fig. 12, ♂ genitalia, ventral; Fig. 13, ♂ genitalia, dorsal.

♂. *Head*: Entirely black haired except for long yellow-white hairs down the median portion of the venter. The eyes are densely setose, the setae are approximately one-half longer than the height of the ocellar triangle. The antennae are entirely black, the flagellum is composed of eight segments (Text-fig. 7). The terminal segment of the palpus is short and thick, scarcely longer than wide. The head is just slightly produced beyond the margins of the eyes. The cardo stipites are well developed and prominent (Text-fig. 7). The height of the ocellar tubercle is about equal to the length of the pedicel of the antenna. *Thorax*: Polished black, except for the yellow humeral ridges, and covered with yellow pile except for dense short brown to

black pile over the anteromedian portion of the mesonotum. The stems of the halteres are yellow, tinged with brown, the knobs are brown to black. *Legs* : Polished black except for the yellow to rufous spurs of the tibiae. The inner spur of the front tibia is rudimentary, very tiny compared to the outer (Text-fig. 11). The hind femur is attenuated on the basal half and the tibia is rather gradually expanded, at its widest point it is slightly thicker than the femur. The tarsi are just slightly swollen, the hind basitarsus is four to five times longer than wide and is about one-half as wide as the tibia (Text-fig. 10). *Wings* : Lightly fumose, the stigma and anterior veins brown ; the posterior veins are yellow, tinged with brown, distinctly darker than the membrane. The *r-m* crossvein is about one-half as long as the basal portion of the radial sector. The forking of veins  $M_1$  and  $M_2$  is variable, in some specimens it is distinctly before the *m* crossvein, in others it is at or beyond the *m* crossvein. Veins  $M_2$  and  $M_{3+4}$  evanesce before reaching the wing margin (Text-fig. 9). *Abdomen* : Subopaque black, lightly pollinose over the dorsum and submetallic on the lateral margins and on the venter. The abdomen is predominantly yellow pilose with black hairs on the genitalia and over terga five to eight. The ninth sternum is clavate almost half its length on the hind margin and has a small U-shaped concavity at the middle of the hind margin and a membranous gibbosity arising from the inner edge of the sclerite (Text-fig. 12), directly ventral to the aedeagus. The claspers are slender and sharp-pointed. The ninth tergum has a V-shaped concavity on the hind margin extending almost half the length of the segment (Text-fig. 13).

Length : Body and wings, 6.75-7.2 mm.

♀. Exhibiting marked sexual dimorphism from the ♂ and readily differentiated by its brilliant yellow-orange thorax and coxae and the dark fumose wings. As seen from dorsal view, the head is markedly narrowed posteriorly and the clypeus is well developed, slightly longer than broad, also the front is about equal in width to one compound eye (Text-fig. 8). As seen from lateral view, the portion of the head behind the compound eyes is equal in length to approximately two-thirds the length of the eye and the head is shaped as in Text-fig. 7. The wings are rather dark coloured, predominantly brown with the stigma only slightly darker than the wing membrane. The venation is like that of the male.

Length : Body, 7.0-7.7 mm.; wings, 9.0-9.6 mm.

Holotype ♂, NEPAL : Taplejung Distr., edge of mixed forest above Sangu, c. 6,500', 17.x-1.xi.1961. (*R. L. Coe*). Allotype ♀, Taplejung Distr., Sangu, c. 6,200', swarming around tents, 2.xi.1961 (*R. L. Coe*). Twenty-six paratypes (eleven ♂, fifteen ♀) all from Taplejung Distr., some same data as holotype and some same data as allotype, others collected at Sangu, c. 6,200', on blooms of wild cherry, 15-18.xi.1961 ; others between Sangu and Tamrang, deep river gorge, c. 5,200', x-xi.1961 and same data as above except shrubs by path, c. 5,800', 6.xi.1961.

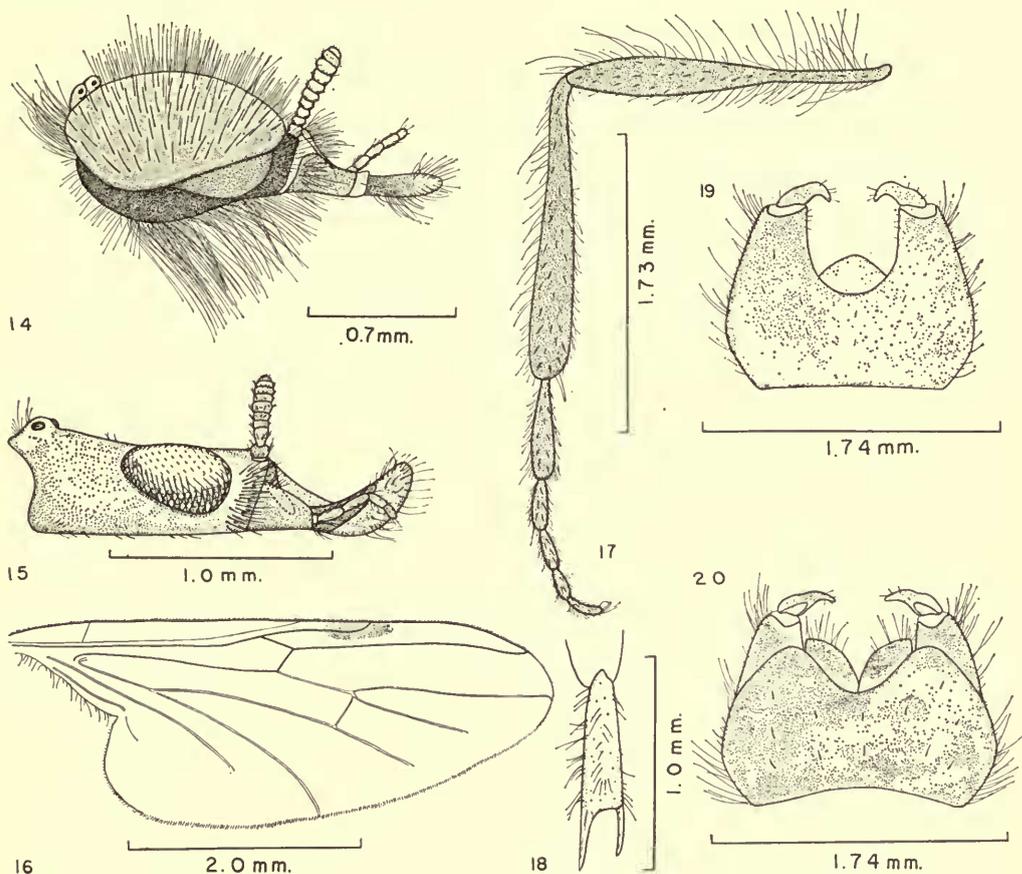
Holotype ♂, allotype ♀ and fifteen paratypes are in the British Museum (Natural History). The remainder of the paratypes are being deposited in the collections of the United States National Museum, B. P. Bishop Museum and the University of Hawaii.

### *Bibio affiniproximus* n. s.p.

(Text-figs. 14-20)

This species would appear to fit near *proximus* Brunetti according to the keys which Brunetti has published for the Indian species. *B. affiniproximus* is readily differentiated by having the wings entirely hyaline except for the dark brown to black stigma and by having the posterior veins colourless, instead of having the wings rather uniformly yellow with the posterior veins coloured darker than the membrane.

It is also characterized by having the rostrum distinctly produced and the cardo stipites well developed (Text-fig. 14), also by the more elongate pile on the eyes and the mesonotum ; the polished black legs ; and by having the *r-m* crossvein approximately equal in length to the base of the radial sector.



FIGS. 14-20. *Bibio affiniproximus* n. sp. Fig. 14, head of ♂ ; Fig. 15, head of ♀ ; Fig. 16, wing ; Fig. 17, hind leg of ♂ ; Fig. 18, front tibia ; Fig. 19, ♂ genitalia, ventral ; Fig. 20, ♂ genitalia, dorsal.

♂. *Head* : By comparison the head is quite elongate, the rostrum is distinctly produced in front of the eyes, this distance is equal or slightly greater than the combined lengths of the scape and pedicel of the antenna. The cardo stipites are very well developed and conspicuous. These fuse ventrally (zygostipes) and form an extension of the rostrum which is about equal in length to the three basal segments of the flagellum of the antenna (Text-fig. 14). The prementum is well developed, is almost as wide as the labellum, and is fused on each side with the bases of the first labial palpal segments. The segments of the palpi are rather short and thick, the apical segment is scarcely longer than wide. The antennae are entirely black, the flagellum is apparently eight-segmented with the last four segments closely joined and distinctly enlarged,

clavate (Text-fig. 14). The entire head is densely black haired, the hairs over the compound eyes are two or more times longer than the height of the ocellar triangle (Text-fig. 14). *Thorax* : Entirely submetallic black, except for the yellow humeral ridges and for a faint tinge of rufous in the ground colour of the pleura. The pile is entirely black. The mesonotum is finely rugose on the sides and down the median portion and is shining in these areas, the dorsocentral lines are opaque black. The scutellum and metanotum are polished black. *Legs* : Predominantly metallic black except for the yellow to rufous tibial claws, and entirely black pilose. The inner spur of the front tibia is approximately three-fourths as long as the outer (Text-fig. 18). The basal two-fifths to one-half of the hind femur is attenuated ; the hind tibia is more gently clavate (Text-fig. 17). The tibia and femur are approximately equal in width. The tarsi are not swollen, the basal segment is five to six times longer than wide. *Wings* : Entirely hyaline except for the dark brown stigma. The anterior veins are brown, tinged with yellow, the posterior veins are colourless. The costa ends at the tip of the radial sector. The *r-m* crossvein is approximately equal in length to the basal section of the radial sector and veins  $M_1$  and  $M_2$  fork at or slightly before the *m* crossvein. Veins  $M_2$  and  $M_{3+4}$  evanesce before reaching the wing margin (Text-fig. 16). It is obvious that the position of the forking of veins  $M_2$  and  $M_1$  is somewhat variable. In the paratype male, on one wing the forking is at the *m* crossvein, on the other it is slightly beyond ; in the allotype the forking is at or very slightly beyond the *m* crossvein. *Abdomen* : Metallic black on the venter, subopaque black on the dorsum and entirely black pilose. The ninth sternum is approximately as broad as long and has a semi-membranous gibbosity in the middle of the posterior margin (Text-fig. 19). The claspers are rather slender and pointed. The ninth tergum is approximately two times wider than long and has a U-shaped concavity in the middle of the hind margin which extends approximately two-fifths the length of the segment (Text-fig. 20).

Length : Body, 5.0 mm.; wings, 4.6 mm.

♀. Exhibiting considerable sexual dimorphism from the male. As seen from direct dorsal view the sclerotized portion of the head is almost two times longer than wide. The portion of the head posterior to the compound eyes is about equal in length to one eye and the sclerotized portion in front of the eye (rostrum) is about two-fifths as long as one eye. As seen from lateral view the head is shaped as in Text-fig. 15. The sclerotized portion of the head and appendages is black, the mouth parts are yellow, tinged with brown. The thorax is entirely yellow except for a tinge of brown on the anteromedian portion of the mesonotum, on the lower portions of the pleura, and on the metanotum. The sclerites at the wing base are dark brown to black. The halteres are yellow-brown. The mesonotum is covered with short yellow setae and the scutellum has yellow setae around its hind margin. The pleura are bare or nearly so. The coxae are yellow, the hind margin of each posterior pair is tinged with brown. The trochanters are yellow, tinged with brown to black posterobasally. The front femur is entirely yellow except for a tinge of brown on the base of the segment. The middle femur is yellow, tinged with brown along the dorsal surface, and the hind femur is shining black, tinged with yellow along the ventral portion. The middle and hind tibiae are metallic black. The basal half of the front tibia is brown, tinged with yellow, the apical portion is yellow to rufous. The inner spur of the front tibia is three-fourths to four-fifths as long as the outer. The hind legs are normal in shape for ♀ *Bibio*. The wings are faintly yellow in colour, this is more distinct along the costal margin. The posterior veins are just slightly darker than the wing membrane. The venation is similar to that of the male. The terga of the abdomen are dark brown, the conjunctiva and the sternum are yellow. The cerci are yellow-brown.

Length : Body, 4.3-4.6 mm.; wings, 6.0 mm.

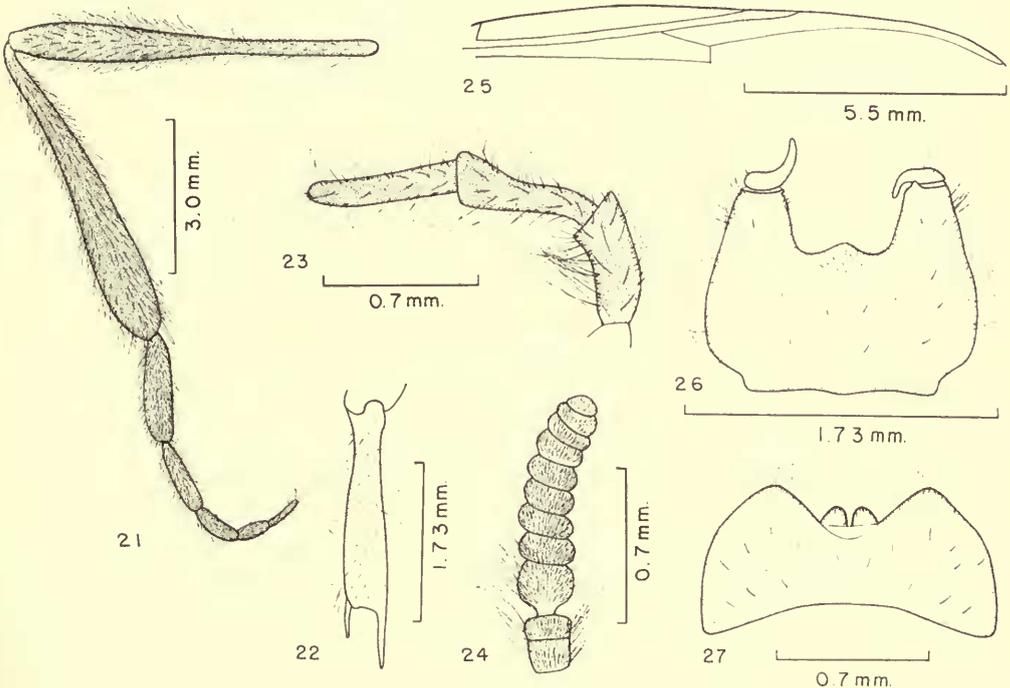
Holotype ♂, allotype ♀, and one paratype ♂, NEPAL : Taplejung Distr., edge of mixed forest above Sangu, c. 6,500', 17.X-I.xi.1961. (*R. L. Coe*).

The holotype and allotype are in the British Museum (Natural History) collection. The paratype is in the University of Hawaii collection.

***Bibio capitaneus* n. s.p.**

(Text-figs. 21-27)

This is the largest known species in the genus *Bibio*. It appears to be most closely related to *B. hortulanoides* Brunetti and would run to this species in Brunetti's keys (1911 : 273 and 1912 : 169). It should be noted, however, that in Brunetti's key to Oriental species of *Bibio* (1925 : 447), this would run to *obscuripennis* de Meijere. This is misleading since Brunetti's key does not include the males of *hortulanoides* and he overlooked the most obvious characters for separating *obscuripennis*, using only size to differentiate this species. *B. capitaneus*, as well as *hortulanoides*, is not related to *obscuripennis*. The latter is readily differentiated by the narrow, linear-sided front tibiae and blunt tibial spurs. (Refer to my remarks under *Bibio nigerrimus* Duda). *B. capitaneus* is readily differentiated from *hortulanoides* by having the wings, including the costal cells and anterior margin, completely hyaline, rather than having the costal cells dark brown and cell  $R_5$  tinged with brown. *B. capitaneus* also differs by being much larger ; having eleven, rather than nine, segments in the antenna ; having the inner spur on the front tibia nearly one-half as long as the outer, rather than rudimentary ; by the more elongate apical segment of the palpus ; and the more thickened hind tarsi.



FIGS. 21-27. *Bibio capitaneus* n. sp. Fig. 21, hind leg of ♂ ; Fig. 22, front tibia ; Fig. 23, palpus ; Fig. 24, antenna ; Fig. 25, anterior margin of wing ; Fig. 26, ♂ genitalia, ventral ; Fig. 27, ninth tergum of ♂.

♂. Entirely shining black species, except for a tinge of rufous on the tibial spurs, and densely covered with black pile. *Head*: The rostrum is not produced, the details of the mouthparts are obscured by the dense black pile. The last segment of the palpus is long and slender (Text-fig. 23), six times longer than wide (0.75 by 0.12 mm.) and slightly longer than the penultimate segment (0.62 mm.). The antenna is 11-segmented, the last two segments are closely joined (Text-fig. 24). The pile of the compound eyes is about two times longer than the height of the ocellar triangle. *Thorax*: Entirely shining black except for a faint tinge of yellow in the ground colour of the posterior portion of each humeral ridge. The mesonotum is finely rugose on the sides and densely pilose except for a bare area down the middle and down the outside of each dorsocentral line. The halteres are entirely black. The sclerites around the wing base are polished black. *Legs*: The front tibia is slender, almost straight-sided, only slightly bulged medianly, the inner spur is approximately one-half as long as the outer (Text-fig. 22). The basal half of the hind femur is attenuated, the apical portion moderately swollen. The hind tibia is gradually enlarged from base to apex and has a bare area extending longitudinally down the posterodorsal surface. The hind femur measures 6.5 mm. in length, the hind tibia 6.0 mm., at their widest points the two segments are approximately equal in width. The hind basitarsus is about five times longer than wide (2.5 mm. long by 0.5 mm. wide) (Text-fig. 21) and is two-thirds as wide as the apex of the tibia. The apical spurs of the hind tibia are sharp pointed. *Wings*: Entirely hyaline except for the brown stigma. The costal cells and anterior margin of the wing are not infuscated. The anterior veins including the humeral crossveins are brown, the posterior veins are colorless. The humeral crossvein is very broad. The costa extends slightly beyond the apex of the radial sector. The *r-m* crossvein is about one-third as long as the basal section of the radial sector (Text-fig. 25). Veins  $M_1$  and  $M_2$  fork slightly before the *m* crossvein. Vein  $M_3$  evanesces just before the wing margin. *Abdomen*: Entirely subshining black, densely black pilose. The ninth tergum is two times wider than long, a broad U-shaped concavity extends about one-half the length of the segment (Text-fig. 27). The claspers are rather slender, pointed at apices. The ninth sternum is shaped as in Text-fig. 26.

Length: Body, 15.5 mm.; wings, 14.0 mm.

♀. Unknown.

Holotype ♂ and one paratype ♂ from NEPAL: Kharikhola, 5,500', 15.xi.1960 (L. Swan).

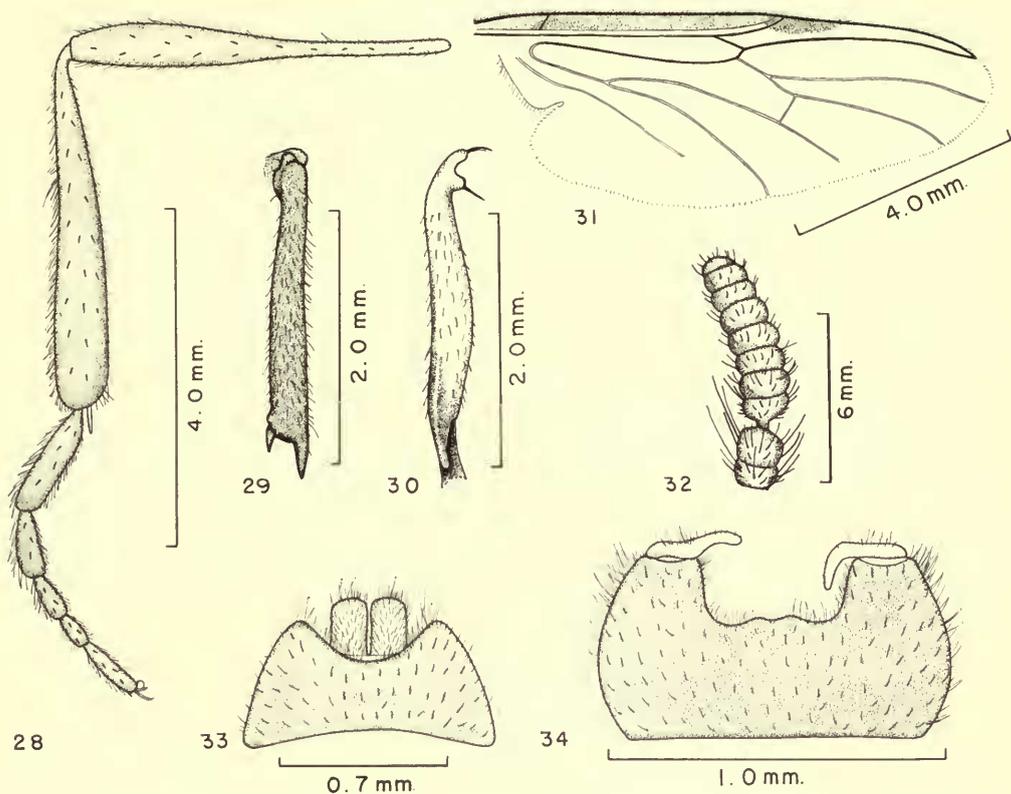
Type in the California Academy of Sciences collection, paratype in the University of Hawaii collection.

### *Bibio nigerrimus* Duda

(Text-figs. 28-34)

*Bibio tenebrosus* var. *nigerrima* Duda, 1930, 4, *Bibionidae*, in Lindner, *Fliegen der Palaearkt.* Reg. 4: 43, 70. [This was spelled "*nigerrimus*" in the key, p. 43, and "*nigerrima*" in the text, p. 70.]

In the recent revision of the Japanese *Bibionidae* (Hardy and Takahashi, 1960: 440) I had decided that *B. obscuripennis* de Meijere and *nigerrimus* Duda were synonyms of *B. tenebrosus* Coquillett. I have since had an opportunity of restudying a large series of specimens from Nepal and from northern India as well as from several localities in China and now feel that it is probable that a complex of species exists which is very closely related to *tenebrosus*. These species are characterized by the rather slender, almost linear-sided front tibia and the very broad blunt outer spur; also by the large size, and dark fumose wings. Typical *tenebrosus* are characterized by having pale yellow pile over at least the pleura and the first two



FIGS. 28-34. *Bibio nigerrimus* Duda. Fig. 28, hind leg of ♂ ; Fig. 29, front tibia, dorsal ; Fig. 30, front tibia, lateral ; Fig. 31, wing ; Fig. 32, antenna ; Fig. 33, ninth tergum of ♂ ; Fig. 34, ♂ genitalia, ventral.

abdominal segments ; also by having eleven distinct segments in the antenna. Specimens from northern India, Nepal, and also Fukien, China, are completely black pilose and have only ten segments in the antenna. Specimens from Nepal (*nigerrimus* Duda) differ from those from northern India (*obscuripennis* de Meijere) by having the ninth tergum of the male broadly U-shaped on the hind margin (Text-fig. 33) rather than having a distinct V-shaped cleft on the hind margin as in *obscuripennis* and also in *tenebrosus*. Also in *nigerrimus* the posterior veins of the wings are concolorous with the grey wing membrane or but faintly yellow, and the second costal cell, stigma, and the anterior veins are dark brownish black. In *obscuripennis* and *tenebrosus* the posterior veins of the wing are brownish yellow, distinctly darker than the wing membrane ; the second costal cell, stigma, and the anterior veins are pale brown. I have studied specimens from the type locality of *nigerrimus* (Chitlong, Nepal) in the Naturhistorisches Museum, Vienna, and have also studied specimens from Darjeeling which were in the Naturhistorisches Museum under *B. obscuripennis*. I have not dissected the male of a specimen from Darjeeling

(the type locality of *obscuripennis*) and the dissected specimens used for this comparison are from the Mishmi Hills, Assam, India. These compare well with my notes made on the Darjeeling specimens in the Naturhistorisches Museum.

This species is readily recognized by its large size, all black coloration and pilosity; by the distinctively shaped front tibiae and tibial spurs (Text-figs. 29, 30); by the ten-segmented antenna (Text-fig. 32); by the smoky wings with dark brown to black costal margin and stigma, and black anterior veins and almost hyaline posterior veins (Text-fig. 31); also by the broadly U-shaped cleft on the hind margin of the ninth tergum (Text-fig. 33). The hind legs are shaped as in Text-fig. 28.

I have not studied a female specimen but presume that the antennae would be eleven-segmented and that they would differ from *tenebrosus* only by having all black pile.

Length : Body, 12.0–13.0 mm. ; wings, 11.0–12.0 mm.

Type locality : NEPAL : Chitlong.

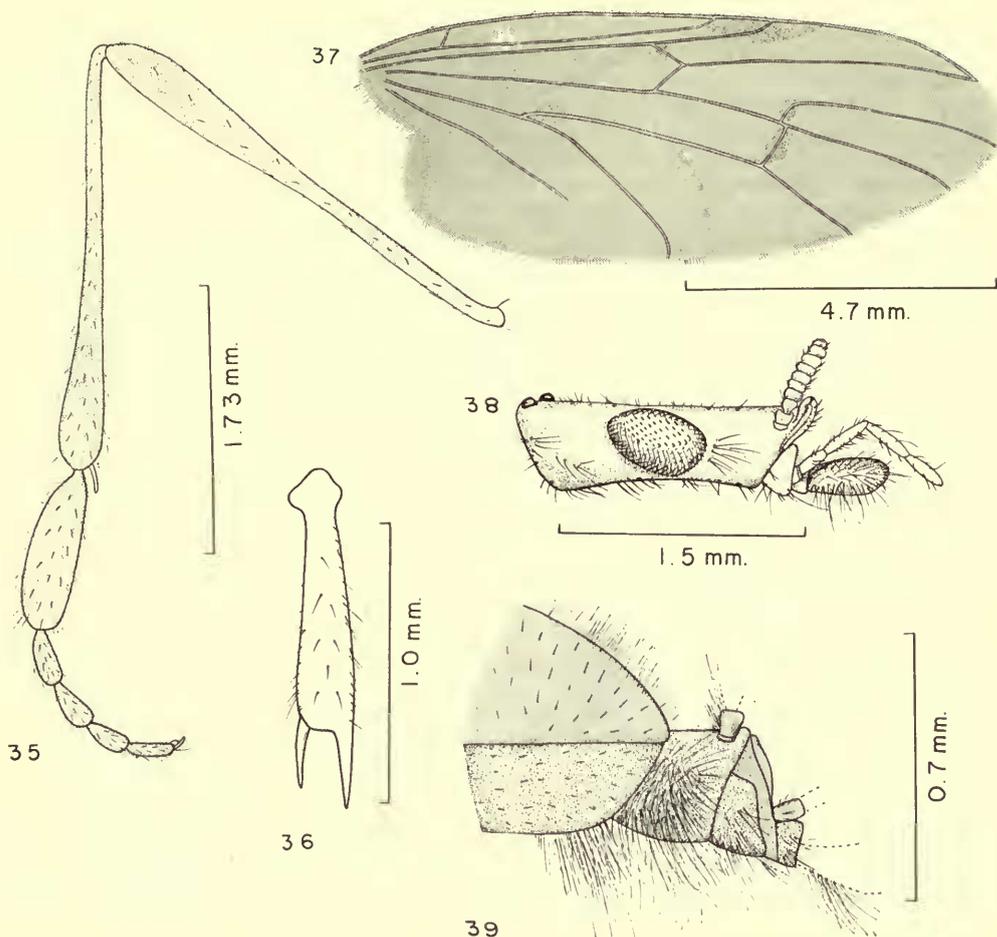
NEPAL : Taplejung District, 19 ♂ (*R. L. Coe*); edge of mixed forest above Sangu, hovering about ten feet from ground in open spaces, c. 6,500', 17.x-1.xi.1961; below Sangu, edge of small mixed wood, c. 6,000', 4.xi.1961 and mixed shrubs in deep gorge, 5,200'; and Sangu, mixed vegetation by stream in gully, ix-x.1961, B.M. (N.H.). NEPAL : Thari, 4,000', 24.x.1960, 2 ♂ (*L. Swan*), in the California Academy of Sciences collection.

### *Bibio scaurus* n. s.p.

(Text-figs. 35–39)

This species fits near *proximus* Brunetti in Brunetti's keys, but differs distinctly by having the hind femora and tibiae much more slender, the hind tarsi inflated, the wings dusky fumose, and the pile of the thorax predominantly black. The rostrum is also rather strongly produced and the hairs on the compound eyes more elongate than in *proximus*. It also appears to be related to *affiniproximus* n. sp. but the swollen hind basitarsi of the ♂, yellow fumose wings with yellow-brown posterior veins, larger size and other details will separate it.

♂. *Head* : Distinctly higher than long with the rostrum (sclerotized portion of the head beyond the eyes) equal to the combined lengths of the first two to three flagellar segments of the antennae. Also with the cardo stipites prominent, well developed (Text-fig. 39). The hairs of the compound eyes are rather elongate, approximately equal in length to twice the height of the ocellar triangle but are sparsely placed. The antennae are entirely black, the flagellum consists of eight clearly defined segments. The last segment of the palpus is slightly longer than the penultimate segment and is approximately four times longer than wide. The pile of the under side of the head is entirely black. *Thorax* : Black haired except for yellow pile on the propleura and on the meso and sternopleura. The mesonotum is subopaque black except for the yellow humeral ridges, and for a tinge of yellow at the wing bases, shining and smooth down each dorsocentral line, otherwise finely rugose. The halteres are dark brown to black. *Legs* : Metallic black except for the yellow to rufous spurs of the tibiae, and except for a faint tinge of rufous in the ground colour of the front femora and the middle tibiae. The inner spur of the front tibia is approximately three-fourths as long as the outer (Text-fig. 36). The hind legs are elongate, the tibiae and femora are slender, attenuated on their basal three-fifths, clavate apically. The hind basitarsus is rather strongly swollen, distinctly thicker than



FIGS. 35-39. *Bibio scaurus* n. sp. Fig. 35, hind leg of ♂; Fig. 36, front tibia; Fig. 37, wing; Fig. 38, head of ♀; Fig. 39, anterior portion of ♂ head.

the hind tibia and scarcely three times longer than wide (Text-fig. 35). *Wings*: Dusky fumose, slightly darker along the costal margin. The stigma is dark brown. The anterior veins are brown, the posterior veins are brown, tinged with yellow, distinctly darker than the wing membrane. The *r-m* crossvein is approximately two-thirds as long as the basal section of the radial sector. Veins  $M_1$  and  $M_2$  fork slightly before the *m* crossvein and veins  $M_2$  and  $M_{3+4}$  extend to the wing margin. *Abdomen*: Shining black in ground colour, dusted with brown to black pollen over the dorsal portion. The genitalia are subshining black. The abdomen is completely black pilose. The genitalia have not been dissected for study. *In situ* the ninth tergum has a rather deep V-shaped concavity on the hind margin, this apparently extends slightly more than one-half the length of the segment. The claspers appear to be rather short and blunt compared to most *Bibio* species.

Length: Body, 6.0 mm.; wings, 6.5 mm.

♀. Showing marked sexual dimorphism from the male. *Head*: Elongate, as seen from dorsal view the head is two times longer than wide. From a lateral view the portion of the

head behind the eye is approximately equal in length to the eye and the sclerotized portion in front of the eye, measured at a level with the bases of the antennae, is also approximately equal in length to the compound eye. The head is predominantly subopaque black, finely rugose. The posteroventral portion is polished black and smooth. The head is yellow pilose except for short brown to black hairs on the anterior portion of the front, and except for black setae on the clypeus, antennae, palpi and mouthparts. The cardo stipites are well developed, approximately equal in length to the two basal flagellar segments of the antennae. The scape of the antenna is brown, faintly tinged with yellow, the pedicel is yellow; the flagellum is dark brown to black. The front margin of the head and the clypeus fit together forming a gibbosity which extends anterior to the antennae bases (Text-fig. 38). *Thorax*: The prothorax is yellow except for a brown to black spot covering the median portion of the notum. The humeri and the humeral ridges are yellow. The mesonotum is largely black, the anterior corners, the lateral margins, and the posteromedian portion are yellow; also a thin yellow vitta extends down each dorsocentral line. The three large black areas, which are set off by the yellow, are subopaque, finely rugose. The pleura are yellow except for the shining black lower two-thirds of each sternopleuron; a black spot at the base of each hypopleuron and one at the lower anterior edge of pteropleuron. The sclerites at the base of the wing are also black. The thorax is entirely yellow pilose. Halteres yellow. *Legs*: Predominantly yellow, tinged with black over the dorsum of the swollen portion of each hind femur, and tinged with brown over the dorsal surfaces of the mid and front femora. The tibiae are yellow except for a faint tinge of brown at the apices of the hind pair and the tarsi are yellow, tinged with brown. The front tibia is as in Text-fig. 36. The hind femur is attenuated on the basal one-half to two-fifths of the segment. The hind tibia is not swollen. *Wings*: Faintly yellowed, more intensely so along the anterior margin. The stigma is yellow, tinged with brown. The anterior veins are brownish yellow, the posterior veins are yellow, faintly tinged with brown but distinctly darker than the wing membrane. Distinct pale brown spots occur at the base of vein  $M_{3+4}$ , over the  $m$  crossvein, and over crossvein  $r-m$  and the base of the radial sector (Text-fig. 37). The wing venation is similar to that of the ♂. *Abdomen*: Shining brown to black over the dorsum, brown, tinged with red on the first four to five sterna and yellow on the posterior sterna. The genitalia are yellow.

Length: Body and wings, 9.0–9.6 mm.

Holotype ♂ and allotype ♀, NEPAL: Taplejung Distr., damp evergreen oak forest above Sangu, c. 8,500–9,200', 2-26.xi.1961 (R. L. Coe), in the British Museum (Natural History).

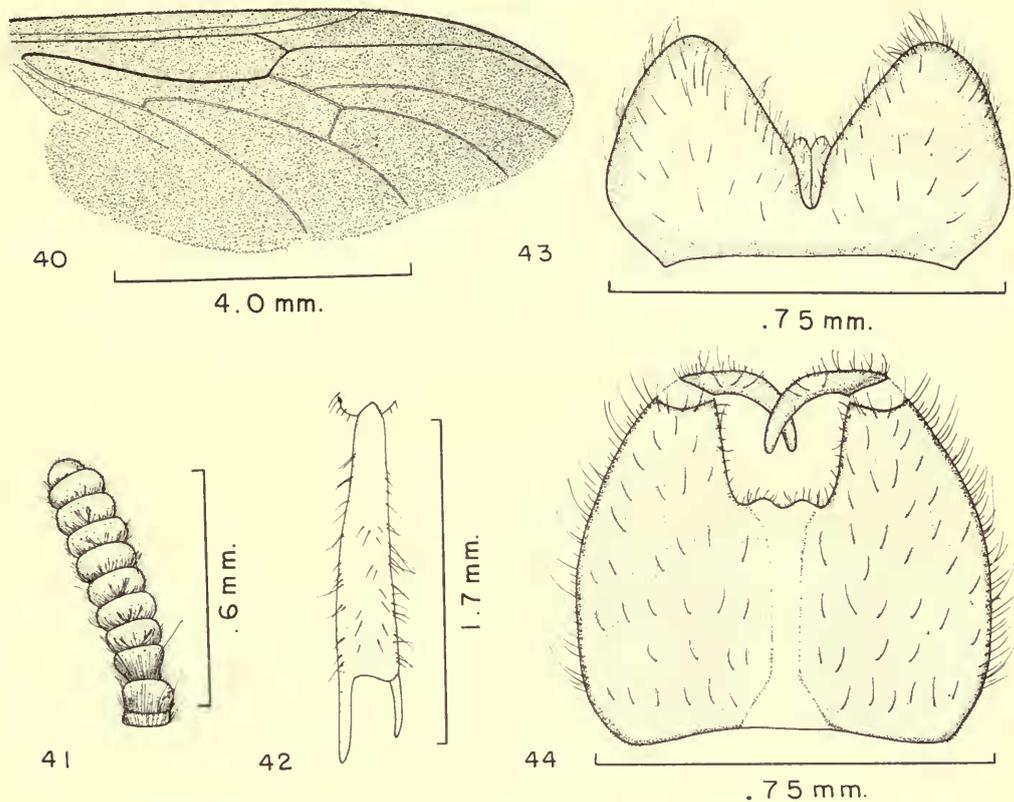
### *Bibio totonigra* n. sp.

(Text-figs. 40–44)

This species superficially resembles *B. nigerrimus* Duda because of the all-black body and appendages and the smoky black wings. The two are not related however, and *totonigra* is readily differentiated by the slender spurs at the apices of the front tibiae; by having the  $r-m$  crossvein almost equal in length to the basal section of the radial sector; as well as by many other details. In the key it fits near *ablusus* n. sp. but is differentiated by the elongate terminal segment of the palpus, the all black pile, smoky black wings, and other characters.

♂. Entirely black species with the body and appendages covered with black pile. *Head*: The rostrum is not developed, the front margin of the head is not produced beyond the eye margins. The antennae are eleven-segmented, the apical two are closely joined (Text-fig. 41). The apical segment of each palpus is slender, slightly longer than the preapical segment, and six or seven times longer than wide. *Thorax*: The lower portion of each sternopleuron is polished black, the pleura are otherwise subshining, finely rugose. The mesonotum is pre-

dominantly opaque black with long black pile on the margins and down each dorsocentral line and is rather coarsely rugose down the median portion and on the sides. The scutellum and metanotum are polished black. *Legs* : Entirely shining black, densely black haired. The inner spur on the front tibia is about three-fourths as long as the outer (Text-fig. 42). It should be noted that the left front tibia of the type is abnormal. This segment is considerably shrivelled,



FIGS. 40-44. *Bibio totonigra* n. sp. Fig. 40, wing ; Fig. 41, antenna ; Fig. 42, front tibia ; Fig. 43, ninth tergum of ♂ ; Fig. 44, ♂ genitalia, ventral.

much shorter than normal and the inner spur is rather poorly developed. The normal development of the more elongate inner spur is borne out by the second specimen at hand. This specimen was not chosen as the type since the abdomen and the hind legs have been broken off. The spurs of the middle and hind tibiae are approximately equal in size and shape. The hind femora are clavate, attenuated on their basal halves. The hind basitarsi are straight-sided, not noticeably thickened, and nearly two times longer than the second tarsal segment. *Wings* : Entirely dark colored, black along the anterior margin, smoky black over most of the membrane. The base of  $R_s$  is slightly longer than the  $r-m$  crossvein. The  $m$  crossvein is situated about its own length from the forking of veins  $M_1$  and  $M_2$ . Veins  $M_2$  and  $M_{3+4}$  evanesce just before the wing margin (Text-fig. 40). *Abdomen* : Entirely subshining black, densely black pilose. The claspers are slender, rather sharp pointed, the ninth sternum is cleft about half its length and a

pair of small submedian bumps are present on the hindmargin. The basal half of the sternum is semi-membranous down the median portion (Text-fig. 44). The ninth tergum is shaped as in Text-fig. 43, a small mound is present in the middle of the hind margin.

Length : Body, 8.9 mm. ; wings, 9.3 mm.  
♀ unknown.

Holotype ♂, NEPAL : Taplejung Distr., damp evergreen oak forest above Sangu, c. 9,200', 2-26.xi.1961 (R. L. Coe). One paratype ♂, same data as type.

Type in the British Museum (Natural History), paratype in the University of Hawaii collection.

### Genus *DILOPHUS* Meigen

*Philia* Meigen, 1800, *Nouv. Class. Mouches* : 20. [A rejected name.]

*Dilophus* Meigen, 1803, *Illiger's Mag.* 1 (2) : 269.

Members of this genus are characterized by having two or three sets of strong spines on each front tibia (Text-fig. 46) and by the simple radial sector of the wing with the basal section of *Rs* short compared to the *r-m* crossvein (Text-fig. 50).

The genus has not previously been reported from Nepal, two species are now known to occur there.

Type species : *Tipula febrilis* Linnaeus.

### *Dilophus gratiosus* Bigot

(Text-figs. 45-47)

*Dilophus gratiosus* Bigot, 1890, *J. Asiat. Soc. Beng.* 59 : 265.

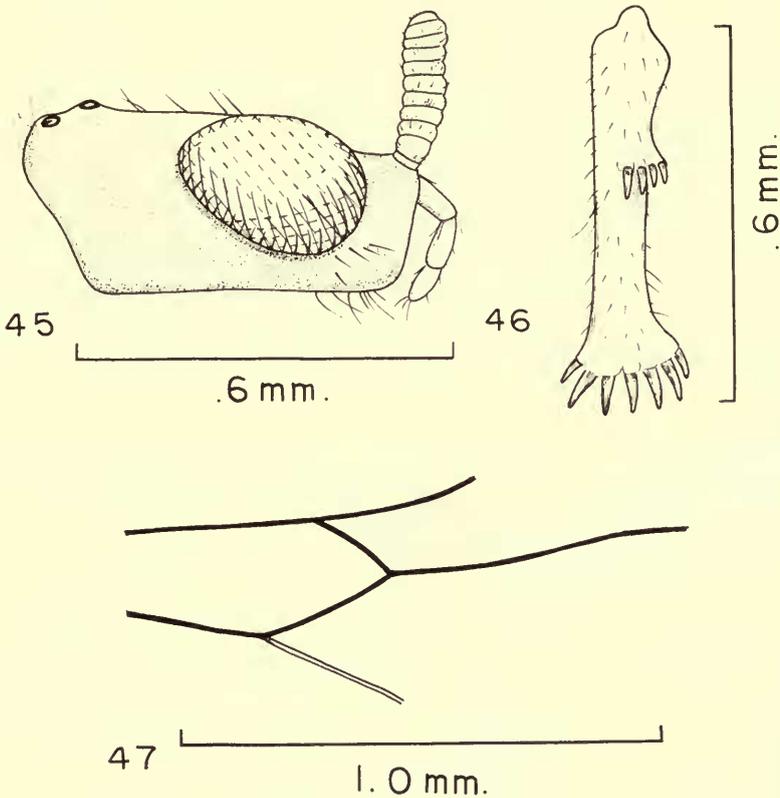
This is the only species of *Dilophus* which has previously been recorded from the Himalaya region. Brunetti recorded it from several localities in northern India and Upper Burma (1911 : 280 and 1912 : 178). It has been differentiated by the predominantly black body and legs of the male, the predominantly red thorax of the female, the short rostrum and the presence of yellow pile over the body and legs. Two ♀ specimens on hand appear to be typical *gratiosus* ; they were not associated with the male and may possibly be the females of the new species *hirsutus* ; on the basis of the wing and leg characters, however, this seems unlikely.

The following descriptive notes are based upon two females from NEPAL, and one ♂ from INDIA : Chhatoru, Spiti Valley, 11,000', 16.vi.1955 (A. P. Kapur).

♂. Entirely shining black, the body and legs are pale yellow pilose except for dark pile on the tarsi. The thorax is sparsely pilose, with short yellow hairs. Brunetti in his redescription (1912 : 178) said that the posterior margin of the scutellum and the sides of the metapleura are bright brownish yellow, on the specimen at hand there is only a rather faint indication of yellow to rufous in the ground colour of the sides of the scutellum. The rostrum is not produced beyond the bases of the antennae and the sclerotized portion of the head in front of the eyes, measured at the antennal bases, is approximately equal in length to the first two flagellar segments of the antenna. On the specimen at hand the legs are entirely shining black, the claws are brownish red. Brunetti described the legs as reddish brown. The front tibia has a transverse row of four short spines arranged at the middle of the segment (Text-fig. 46). The leg segments are rather slender, the hind basitarsi are about half as long as the tibiae. The wings are subhyaline, faintly yellowish along the costal margin ; the stigma is pale brown. The base of the radial

sector is approximately one-half as long as the *r-m* crossvein (Text-fig. 47). The ♂ genitalia have not been dissected for study.

The ♀ head is polished black, smooth, the front is approximately equal in width to one compound eye. The head is slightly longer than wide, as seen from lateral view it is as in Text-fig. 45. The thorax is predominantly rufous, typically with a dark brown to black vitta extending down the anteromedian portion. The coxae, trochanters, and the first two pairs of



FIGS. 45-47. *Dilophus gratiosus* Bigot. Fig. 45, head of ♀; Fig. 46, front tibia; Fig. 47, middle portion of wing.

femora are yellow to rufous. Each middle femur is tinged with brown at the apex. The hind femur is yellow to rufous on the basal two-thirds, shining brown to black on the apex. The tibiae and tarsi are shining black. The tibial spines are slightly larger, more prominent than in the ♂. The wings are yellow fumose, darker along the costal margin. The stigma and anterior veins are dark brown, the posterior veins are yellow, tinged with brown. The venation is similar to that of the ♂. The abdomen is brown to black on the dorsum, rufous, faintly tinged with brown on the venter. The cerci are dark brown.

Length: Body and wings, 3.5-3.75 mm.

Type locality: Dharamsala, western Himalayas. Type in the Indian Museum.

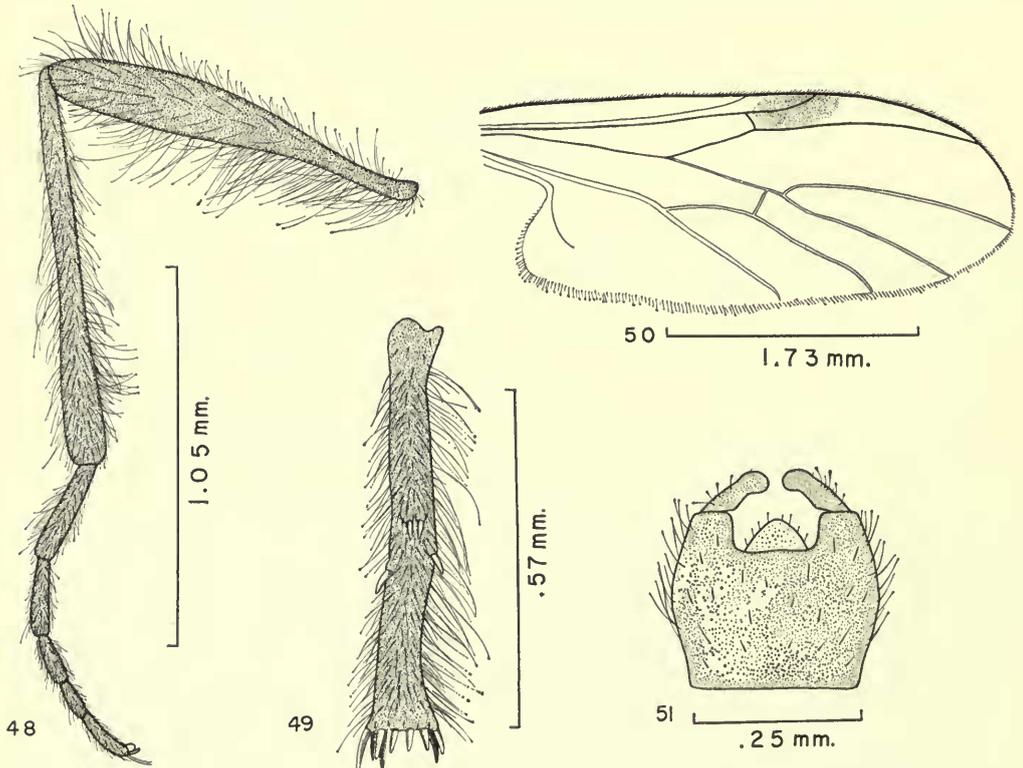
The two ♀ specimens on hand are from NEPAL: Ghanpokhara, 5,500-7,000', 2.v.1954 (J. Quinlan).

*Dilophus hirsutus* n. sp.

(Text-figs. 48-51)

This species is somewhat similar to *gratiosus* Bigot but differs by having the basal section of the radial sector very short, approximately one-fifth as long as the *r-m* crossvein, rather than being approximately one-half as long as the *r-m*; by having the body and legs densely black pilose, rather than sparsely pale pilose; by having spines at the middle of the front tibia differently arranged as in Text-figs. 49 and 46; and the hind basitarsus comparatively short (Text-fig. 48). Also the wings of the male are distinctly fumose and the costal vein extends about half the distance between the apices of the *R*s and *M*<sub>1</sub> (Text-fig. 50).

♂. Entirely shining black species, including the appendages, and densely covered with black pile. *Head*: The eyes are densely covered with moderately long black pile, the hairs are approximately two times longer than the height of the ocellar triangle. The head beyond the eyes is very short, completely obscured by the dense black pile of the front of the head. The palpi are very short and inconspicuous, only two or three short segments are visible on the specimens at hand and the labellum is not extended. The flagellum of the antenna is made up of six to seven segments, the apical segments are closely fused and the apical portion is distinctly enlarged, clavate. *Thorax*: Predominantly polished black, finely rugose down the median



FIGS. 48-51. *Dilophus hirsutus* n. sp. Fig. 48, hind leg; Fig. 49, front tibia; Fig. 50, wing; Fig. 51, ♂ genitalia, ventral.

portion and on the sides of the mesonotum, also on the pleura and the scutellum. The mesonotum has an abundance of long black hairs on the sides and down the dorsocentral lines. The scutellum is densely black haired around the margin. The pile of the pleura is dark brown to black. The halteres are brown, tinged with yellow on the stems. *Legs* : Polished black, densely black pilose except for a few scattered yellow ventral hairs on the apical one-half to three-fifths of the hind femur. Four dorsal spines are arranged near the middle of the front tibia ; these are arranged as in Text-fig. 49. The apical spur is equal in size to the apical spines. The hind basitarsus is slender, but rather short, scarcely over one-fourth as long as the tibia (Text-fig. 48). *Wings* : Faintly infuscated, the anterior veins and stigma are dark brown, the posterior veins are yellow, tinged with brown. The base of the radial sector is approximately one-fifth as long as the *r-m* crossvein and the fork of veins  $M_1$  and  $M_2$  is well beyond the *m* crossvein (Text-fig. 50). The costa extends approximately one-half the distance between the apices of the radial sector and vein  $M_1$ . *Abdomen* : Shining black, rather slender, covered with black pile on the basal four segments and yellow pilose on the apical four segments and on the genitalia. The genitalia as seen from ventral view are as in Text-fig. 51, the cleft on the postero-medial margin of the ninth sternum is rather shallow and the claspers are rounded, blunt at apices. The ninth tergum is damaged on the specimen which has been relaxed for study. It appears to be about one-half wider than long with a gentle concavity on the posterior margin.

Length : Body, 3.5 mm. ; wings, 4.0 mm.

♀ unknown.

Holotype ♂ and eight paratypes ♂, E. NEPAL : S. of Makalu, 5.ix.1954, 13,500' (L. W. Swan).

Type and four paratypes in the California Academy of Sciences, two paratypes are being deposited in the British Museum (Natural History), and two in the collection of the University of Hawaii.

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